

# THERMOELECTRIC CLOUD CHAMBER

LA60-445

## INTRODUCTION:



The Lascells cloud chamber is the perfect alternative to existing unreliable and time consuming dry ice variants.

The chamber is self-contained and thermoelectrically cooled. The chamber requires no dry ice; the only setup necessary is the addition of isopropyl alcohol and connection to a mains socket.

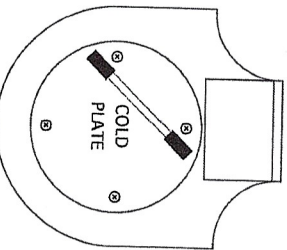
The chamber contains an integrated power supply and illumination of the chamber is provided by a high intensity LED.

Using the provided source, tracks should be visible within 10 minutes. Once running the cloud chamber can be made to run for extended periods by adding more alcohol through the access provided in the lid.

## THE SOURCE

The source provided is a thoriated tungsten rod (2%). Thorium is an Alpha emitter and the primary tracks will be due to alpha particles. Occasionally Beta tracks will be seen due to the daughter nuclei of previous decays.

**Although the source is of low activity, local procedures should be followed for use and storage of the radioactive source.**



Recommended source position.

Other sources may be used with the cloud chamber. Results however will vary depending on the activity of the source and the position relative to the active area.

## SETTING UP:

The cloud chamber should produce tracks within 10 minutes of start-up allowing it to be set up during a lesson. If the cloud chamber is to be demonstrated at the beginning of a lesson or if ambient temperatures are high it may be advisable to start the chamber early.

Situate the cloud chamber away from bright light sources and ensure that the cold plate is level by adjusting the feet on the chamber.

Place the source as shown in the diagram and fit the chamber and lid onto the cold plate.

Plug the chamber into an available mains outlet.

Rotate the black lid to expose the filling slots and apply Propan-2-ol (Isopropyl Alcohol) to the felt using a pipette. (Ensure the felt is saturated; try to avoid overloading to the extent that alcohol drips into the chamber, if this occurs the excess may be mopped up with a paper towel.)

## TAKE CARE NOT TO SPILL ALCOHOL ONTO ANY OTHER SURFACE OR THE APPARATUS

Close the lid and switch on the chamber and illumination LED (The power indicator will illuminate and the cooling fan will operate).

Within 2 minutes a small pool of alcohol will form in the centre of the cold plate creating an 'active area'.

The supplied polystyrene disc can be friction charged (by rubbing vigorously on an item of clothing or hair) and placed on top of the lid. Occasional removal and replacement of the disc may improve track visibility. In addition gently polishing the side of the transparent tube with a soft dry tissue can significantly improve results.

Tracks from the supplied source should be visible within 10 minutes (very warm surroundings may increase this time) and should continue to improve as time goes on.

The chamber will run for approximately 45 minutes without the need for refilling. For prolonged operation the alcohol may be topped up if care is taken and the polycarbonate chamber occasionally removed to mop up excess alcohol on the cold plate surface.

## **TROUBLESHOOTING:**

### **NO TRACKS VISIBLE AFTER 10 MINUTES:**

- Ensure power is supplied to the device, the cooling fan is running and the illumination LED is switched on.
- Check that the filling slots are closed by rotating the lid.
- Ensure the chamber and lid are seated correctly.
- Check that the felt is saturated with Propan-2-ol.
- Remove the polystyrene disc, recharge and replace.
- Gently polish the side of the tube with a soft dry tissue (while the chamber is running)

### **TRACKS ARE POORLY DEFINED OR UNCLEAR:**

- Recharge and replace the polystyrene disc or remove completely.
- Ensure the LED illumination is switched on.
- Reduce external lighting.
- Gently polish the side of the tube with a soft dry tissue (while the chamber is running)
- Change the viewing angle by looking at the chamber from a different position.

### **TRACKS ARE INFREQUENT:**

- Sometimes there may be a gap of a few seconds between visible tracks. This is due to the random emission of particles and not a fault with the apparatus.

### **PACKING AWAY:**

Once switched off the chamber should be wiped dry before storing ensuring alcohol is not transferred to other parts of the apparatus. Do not use any products or materials that will scratch the polycarbonate chamber. A soft dry cloth should be sufficient.

Remove the lid and allow the alcohol to evaporate from the felt completely before storing.

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